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ABSTRACT

Reported at this symposium were investigations using the projective "Tree Drawing" test in (1) a case study of the impact of natural and cultural environments on Japanese children attending elementary and junior high schools in Singapore by Kimio Yoshikawa and K. Loganathan Mutharayan; (2) a study comparing cognitive processes of normal, mentally retarded, slow learning, and handicapped children by Shripati Upadhyaya and K. Loganathan Mutharayan; and (3) an abstract of a case study of cultural change from pre-adolescence to adolescence of Japanese students attending junior high in Singapore, by Fuminari Nagano and Kimio Yoshikawa. Providing the first quantitative analysis of the culture change of Japanese children residing in a country foreign to them, the study of children attending the Japanese School in Singapore reports the form analysis of the projective test and its relationship to cultural and ecological variables. Findings indicated that the Japanese children were maximally affected by their new environment in the first year of stay during which they became "tropicalized" in their functioning. The study of cognitive processes of normal, deaf, slow learning, and mentally retarded Malaysian, Chinese, or Indian children points out differences by psychological condition/handicap and culture in the distribution of form types and their space configurations. Findings are interpreted in terms of Jungian analytical psychology and principles of agamic psychology (Mutharayan, 1983, 1984). The study of Japanese junior high school students in Singapore indicated that across three grades the tree forms drawn changed from the juvenile to the adult type. A total of 60 percent of students in the first year of junior high drew predominantly palm trees; drawings of students in later grades revealed a re-emergence of the temperate form. (RH)

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SYMPOSIUM III B : The Tree Drawing Test: a Measurement of Cognitive Development

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The Impact of Natural and Cultural Environment on Japanese Children in Singapore: a Case Study of Cultural Change

Kimio Yoshikawa and K. Loganathan Mutharayan

INTRODUCTION

A new type of projective test, 'Tree-Test', has been found useful to investigate the unconscious organisation of the psychological factors that determine the cognitive development and personality factors of children. A pilot study was made among Malaysian children in the states of Penang, Perak and Kedah in 1981 and the findings were reported at the Third Asian Regional Conference of IACCP on May, 1983 (Yoshikawa and Mutharayan). At about the same time, a similar test was conducted among the Japanese children in Singapore and the present report contains the findings of this study.

In the Tree Drawing Test, children are asked to draw a tree bearing fruits and the tree thus drawn is subjected to a variety of analysis to elucidate the gestaltic organisation of the psychological functions of the subjects. An important analysis is with respect to the overall *form* of the tree drawn. There exists a variety of *forms: B, C, R, P* and *M* (Table 1) with each having also a juvenile *form: Bi, Ci, Ri, Pi* and *Mi* (Yoshikawa, 1978). Studies have shown that this overall *form* can be taken as reflective of the overall organisation of the personality of the subjects. The *form* also reveals the influences of ecological and cultural factors in the psychological functioning of the subjects and the level of cognitive maturity in all of them. From our earlier studies (Yoshikawa and Mutharayan, 1983), it emerged that the ecological and cultural factors become quite dominant particularly among children in the *lower* primary schools both in Malaysia and Japan (Yoshikawa, 1976, Nakao and Yoshikawa, 1979a, 1979b; Nakao, Iwaki and Yoshikawa, 1982; Iwaki, Nakao and Yoshikawa, 1982).

Table 1
Classification of BAUM Form and Its Abbreviation from Adults to Infants

Form	Abbreviation	BAUM Form
Adult Form	B	Basic form
	C	Crown form
	R	Radial form
	P	Palm form
	M	Musa form
Juvenile Form	Bi	Basic-infant form
	Ci	Crown-infant form
	Ri	Radial-infant form
	Pi	Palm-infant form
	Mi	Musa-infant form
Accompanying	H	Humanoid form
Infant Form	Bo	Basicoid form
	Co	Crownoid form
	Ro	Radialoid form
	Po	Palmoid form
	Mo	Musaoid form
Under-infant Form	Io	Infantoid form
Rambling Form	II	Infant-infant form
Other Form	T	Trunk form
	A	Abstract form
	F	Fungus form
	G	Grass form
	No	Non-drawing

MATERIALS AND METHODS

Tree-Test (Tree Drawing Test) was conducted among the primary school children and the junior high school pupils of the Japanese School in Singapore in 1981. The number of children and sex differences are shown in Table 2.

Table 2
Details of Children Tested

Standard	Male	Female	Total
1	20	17	37
2	20	21	41
3	18	17	35
4	22	19	41
5	19	23	42
6	18	19	37
Total	117	116	233

Instructions given were as follows:

(1) Please draw a tree bearing fruits.
(2) Please draw within 10 minutes with a soft pencil.
(3) You can use a pencil eraser.
(4) You can use the drawing paper horizontally or vertically.
(5) If you cannot draw a tree bearing fruits, please draw a tree of any type.
(6) Do not refer to a live free or picture.
(7) Write the following on the reverse side of the drawing paper:
    (a) Name, date of birth and sex.
    (b) Height (cm.) and weight (kg.) of your body.
    (c) Name of tree you have drawn.
    (d) Date on which the children are given drawing paper (210 x 297 mm^2, A4 size) and a soft pencil.

This test requires a non-verbal response and therefore it can be applied to any person from a child to an adult, irrespective of differences in sex or culture. Furthermore, the method is quite easy to administer and more economical than many other projective methods. It can also be administered individually or in groups.

The term BAUM is used to designate the tree *drawn*. For example, if some children draw an apple tree, we call the drawing 'BAUM apple' and if another one draws a palm tree, then 'BAUM palm' and so forth. We take the holistic approach (Smuts, 1926) to analyse the form of the tree-drawn (BAUM) in contrast with the analytical approach of Koch (Koch, 1952 and 1957). The tree drawn by the children is taken to represent their total image (total personality). Therefore we analyse BAUM into *form* and then space symbolism (space configuration) in which we are concerned with the locality of the BAUM in the paper. We look at the total image (crown and trunk) and calculate its centre of gravity to specify

its space configuration (Figure 1). In this study, however, we report only the *form* analysis of BAUM in relation to the cultural and ecological variables.

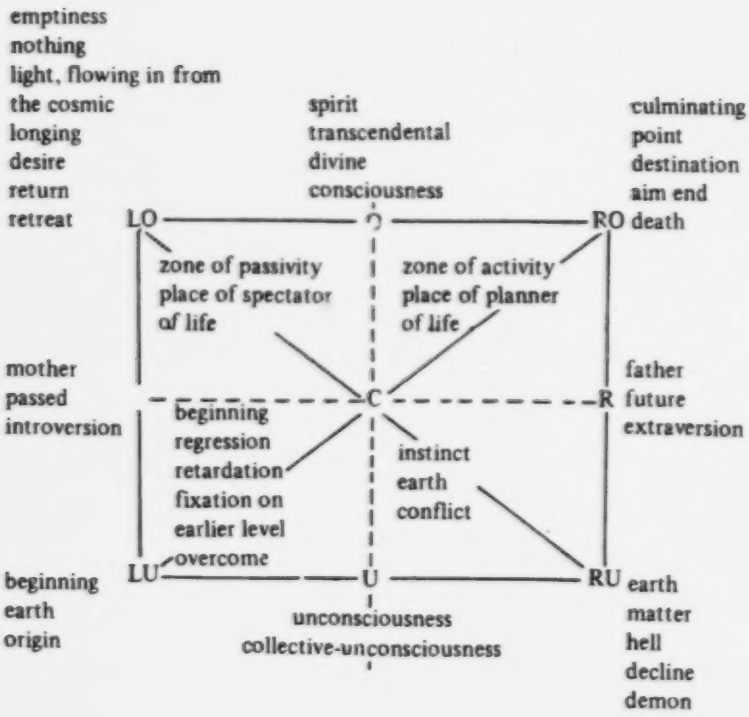

Figure 1: Space Configuration After Grnward

Table 3
Frequency Distribution of Tree-Form of Primary Children (Std. 1–4) in the Japanese School in Singapore, 1981

Std.	Sex	Tree-form Grade												
		Io	Bo	Co	Ro	Po	Mo	Bi	Ci	Ri	Pi	Mi	R	
1	M		5 (25.0)	5 (25.0)		4 (20.0)			2 (10.0)		4 (20.0)			20
	F			3 (17.6)		3 (17.6)	2 (11.8)	1 (5.9)	6 (35.3)	1 (5.9)	1 (5.9)			17
	T		5 (13.5)	8 (21.6)	0	7 (18.9)	2 (5.4)	1 (2.7)	8 (21.6)	1 (2.7)	5 (13.5)			37
2	M		5 (25.0)	3 (15.0)	2 (10.0)	4 (20.0)			2 (10.0)	4 (20.0)				20
	F		1 (4.8)		2 (9.5)	3 (34.3)		1 (4.8)	10 (47.6)	1 (4.8)	3 (14.3)			21
	T		6 (14.6)	3 (7.3)	4 (9.8)	7 (17.1)	0	1 (2.4)	12 (29.3)	1 (2.4)	7 (17.1)			41
3	M		2 (11.1)	2 (11.1)		9 (50.0)	1 (5.6)		3 (16.7)		1 (5.6)			18
	F			2 (11.8)		6 (35.3)	2 (11.8)	1 (5.9)	5 (29.4)	1 (5.9)				17
	T		2 (5.7)	4 (11.4)	0	15 (42.9)	3 (8.6)	1 (2.9)	8 (22.9)	1 (2.9)	1 (2.9)			35
4	M		1 (4.5)	1 (4.5)		4 (18.2)		1 (4.5)	4 (18.2)	2 (9.1)	8 (36.4)	1 (4.5)		22
	F	1 (5.3)							5 (26.3)	3 (15.8)	9 (47.4)			19
	T	1 (2.4)	1 (2.4)	1 (2.4)		4 (9.8)		1 (2.4)	9 (22.0)	5 (12.2)	17 (2.4)	1 (2.4)		41

Notes. In Tables 3 and 4, M = male, F = female and T = total. Figures within brackets are in percentages.

Table 4
Frequency Distribution of Tree-Form of Primary Children (Std. 5–6) in the Japanese School in Singapore, 1981

Std.	Sex	Tree-form Grade										
		Bo	Bi	Ci	Ri	Pi	Mi	B	C	R	P	
5	M	–	–	4 (21.1)	–	11 (58.9)	–	–	–	–	4 (21.1)	19
	F	–	1 (4.4)	1 (4.4)	3 (13.0)	11 (47.8)	–	–	1 (4.4)	–	6 (26.1)	23
	T	–	1 (2.4)	5 (11.9)	3 (7.1)	22 (52.4)	–	–	1 (2.4)	–	10 (23.8)	42
6	M	–	–	2 (11.1)	–	10 (55.6)	1 (5.6)	–	1 (5.6)	–	4 (22.2)	18
	F	1 (5.3)	–	4 (21.1)	–	7 (36.8)	–	–	3 (15.8)	2 (10.5)	2 (10.5)	19
	T	1 (2.7)	–	6 (16.2)	–	17 (45.9)	1 (2.7)	–	4 (10.8)	2 (5.4)	6 (16.2)	37

Table 5
Component of Two Main Natural Tree Group in Each Year Grade of Primary Children in the Japanese School in Singapore, 1981

Year Grade	Tropical Tree			Temperate Trees		
	No. of Individuals	Accumulation: No. of Individuals	%	No. of Individuals	Accumulation: No. of Individuals	%
1	16 (37)	16 (37)	43.2 (43.2)	21 (37)	21 (37)	56.8 (56.8)
2	16 (41)	32 (78)	39.0 (41.0)	25 (41)	46 (78)	61.0 (59.0)
3	20 (35)	52 (113)	57.1 (46.0)	15 (35)	61 (113)	42.9 (54.0)
4	29 (41)	81 (154)	70.7 (52.6)	12 (41)	73 (154)	29.3 (47.4)
5	32 (42)	113 (196)	76.2 (57.7)	10 (42)	83 (196)	23.8 (42.3)
6	25 (37)	138 (233)	67.6 (59.2)	12 (37)	95 (233)	32.4 (40.8)

Note. In Tables 5 to 7, figures within brackets are in percentages.

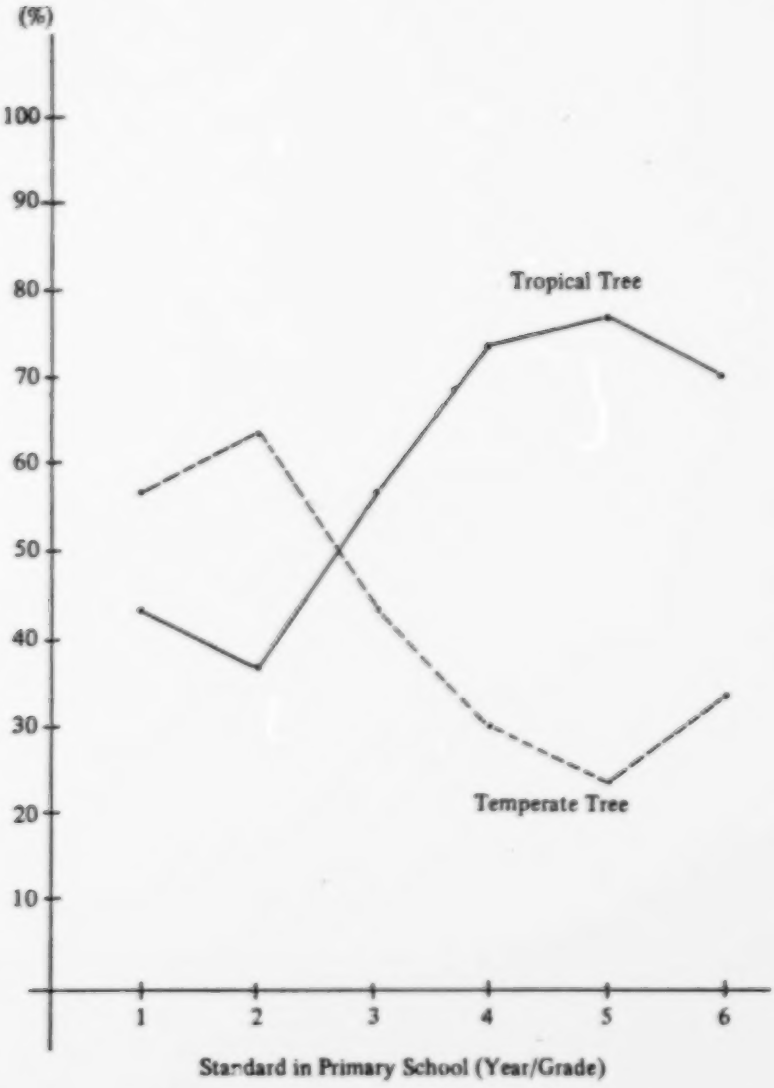

Figure 2. Comparison Between Tropical and Temperate Trees in Tree-Test Under a Probability Distribution of Japanese Primary School Children in Singapore, 1981.

Table 6
Distribution of Interrelationship between BAUM-form and Duration of Stay of Primary Children of the Japanese School in Singapore, 1981

Duration (year)	Tree-form Grade						
	Io	B (Bo+Bi)	C (Co+Ci)	R (Ro+Ri)	P (Po+Pi)	M (Mo+Mi)	Total
1		8 (15.4)	19 (36.5)	5 (9.6)	19 (36.5)	1 (1.9)	52 (99.9)
2	1	3 (5.3)	16 (28.1)	7 (12.3)	29 (50.9)	2 (3.5)	57 (100.1)
3	1 (1.6)	3 (4.8)	19 (30.2)	2 (3.2)	35 (55.5)	3 (4.8)	63 (100.1)
4		5 (18.5)	4 (14.8)	2 (7.4)	15 (55.6)	1 (3.7)	27 (100.0)
5			3	1	6		10
6					5		5
7			2	1	3		6
8		2	1	1	1		5
9					1		1
10			1				1
11			1				1
12					1		1

Table 7
BAUM Form in Relation To Duration of Stay of Primary Children of the Japanese School in Singapore, 1981

Duration of Stay	Tropical Tree	Temperate Tree
1	21 (41.2)	30 (58.8)
2	37 (67.3)	18 (32.7)
3	40 (67.8)	19 (32.2)
4	19 (73.1)	7 (26.9)
5	7 (70.0)	3 (30.0)
6	5 (100.0)	0
7	3 (50.0)	3 (50.0)
8	2 (40.0)	3 (60.0)
9	1 (100.0)	0
10	0	1 (100.0)
11	0	1 (100.0)
12	1 (100.0)	0
Total	136 (61.5)	85 (38.5)

RESULTS

The trees drawn by Japanese children domiciled in Singapore for varying periods reveal some interesting features in cultural and ecological adaptation. The form of trees drawn by children is shown in Tables 3 and 4. The tables reveal that the children in Standard 4 were *more diverse* in their production of juvenile forms than those in Standard 2 who mainly drew the lowest form (infantoid form, *Bo, Co, Ro, Po* and *Mo*), a situation quite similar to that prevailing in Japan. However, children in Standard 6 began to show some important differences. The tropical Palm-Form (P + Pi) began to dominate and was seen to be 60% more than in Standard 2 and 4. What is more interesting is that this frequency is almost the same as that of Malaysian school children in the same standard (Yoshikawa and Mutharayan, 1983).

The period of domicile of the Japanese children is an important factor in this change. The change begins to show when the type of tree drawn shifts from being a temperate to a tropical one (Table 5). This change is most rapid in the first year of stay and reaches the level of children in the tropics i.e. 60% tropical trees in about a year (Figure 2). Subsequent to this, there is hardly any shift. Children who have stayed for 1.5–2 years have the same frequency level (Tables 6 and 7). This shows that the Japanese children are maximally affected by the new environment in their first year of stay during which they eventually become 'tropicalised' in their functioning. This shift may also be indicative of other cultural adaptations as the form is reflective of a total gestaltic change in the psychological processes, a matter that remains to be investigated.

DISCUSSION

Japanese children who have stayed overseas create problems on returning home. Quite a number of them find it difficult to re-adapt themselves to Japanese culture. This is becoming one of the most important problems of Japanese children who have stayed overseas for some time. This article is the first quantitative analysis of culture change of Japanese children. Yoshikawa (1981), using the same method, had studied also the culture change of the Vietnamese who have been displaced but not all of them indicated some form of culture change. Almost all of them drew a Palm-Form, the exception being a girl who drew a Crown-Form. She, too, was found to have been working in a Japanese commercial office. It must be mentioned that Vietnamese tested had only stayed in Japan for a few months.

An important contribution of the present study to such a problem is that while about 60% of the Japanese children who have stayed overseas for more than a year may suffer some form of 'culture shock', about

40% of them may not have such problems at all. Also, it appears that at least a year is necessary for the new cultural and ecological factors to exercise any influence on the psychology of children.

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Cultural Change From Pre-Adolescence to Adolescence of Japanese School Pupils in Singapore: a Case Study Using a Projective Method **

Fuminari Nagano and Kimio Yoshikawa

Ecological and cultural factors have some impact on children as they develop from pre-adolescence to adolescence. The present study attempts to identify some of the unconscious factors affecting development which is activated by ecological and cultural factors. The Tree Drawing Test, a projective method, is used to achieve the purpose of this study.

The sample consists of 97 Japanese pupils in a junior high school in Singapore. They are in Grade 1, 2 and 3.

Results show that the tree drawn, known as BAUM-form, changes from the juvenile to adult form. The adult form of BAUM is quite realistic and is close to the natural features.

Examining the type of trees drawn, 60% of the first grade in junior high school drew predominantly palms trees. This percentage is close to that of Standard 6 students in primary schools. The drawings of the second and third grade of junior high school indicate a re-emergence of the earlier form. The re-emergence of temperate trees may be indicative of the reactivation of cultural forces of early childhood which was temporarily suppressed by new environmental forces.

Cognitive Processes of the Mentally Retarded, the Slow Learners and the Handicapped Using the Tree Drawing Test

Shripati Upadhyaya and K. Loganatha Mutharayan

INTRODUCTION

Picture-drawing techniques as a measure of cognitive functions and personality have been popular with educationists and psychologists. As early as 1926, Goodenough developed a standardised procedure for evaluating the intelligence of children from their drawings of a man. At about the same period, Emil Jucker introduced the 'Tree Drawing Test' in vocational guidance settings which was carried further in more elaborate manner by Charles Koch (1952). To date, existing picture drawing techniques are: Draw-a-Man test or D-A-M (Goodenough, 1926), House-Tree-Person or H-T-P technique (Buck, 1948), Draw-a-Person or D-A-P test (Machover, 1949) and the Tree Test (Koch, 1952).

Picture drawings became an important tool with psychodynamic therapists who used it as a projective technique. It was assumed that by drawing pictures, the person reveals his structuring principles which is in fact his own psychological structure without even being aware that he is doing so. Thus through the mechanism of projection, a person revealed his inner thoughts, feelings, ego functioning and unconscious strivings.

Koch (1952) used the 'Tree Drawing Test' as an aid to the diagnosis of vocational aptitude, educational consultations and clinical settings for cognitive and personality functioning.

The most extensive work outside Europe with the 'Tree Test' has been done in Japan by Yoshikawa and his co-workers. The test was administered to pre-school children through to university students in Osaka to study the development of personality (Huzioka and Yoshikawa, 1971; Nakao and Yoshikawa, 1974; Nakao and Yoshikawa, 1975; Nakao and

Yoshikawa, 1978; Nakao and Yoshikawa, 1979 (a) and (b); Iwaki and Yoshikawa, 1980; Nakao and Yoshikawa, 1980; Nakao, Yoshikawa and Iwaki, 1981). Yoshikawa (1976) also undertook cross-cultural studies and studied the impact of ecology and culture on the cognitive development of children (Yoshikawa and Mutharayan, 1983).

All the studies conducted using the 'Tree Test' suggest that this test has potentials for assessing cognitive and personality functions and that it can be used as a psychodiagnostic method in the field of education and mental health.

PRESENT STUDY

Aims

The present study was undertaken with the following aims:

(1) Study the profiles of mentally retarded, slow learners and deaf children on the 'Tree Test' in order to see whether any commonalities exist as compared to normal children.
(2) Investigate the differential signs unique in each of the 3 groups of children.
(3) Use the preliminary findings for formulation of hypothesis for future testing.

Sample

The sample consists of:

(1) 110 slow learners, Standards 1 to 6 in three primary schools of Kroh, a border town in Thailand;
(2) 66 deaf children, pre-school as well as from Standard 1 to 3 from the School for the Deaf, Penang; and
(3) 27 mentally retarded children from the School for Retarded Children, Penang.

This was a purposive sample. Slow learners were identified by their teachers on the basis of their performance in class as well as academic results. Similarly, the retarded children were chosen by the teacher concerned on the basis of their ability to comprehend instruction and ability to do writing work. The sample of normal children was collected from a previous study (Yoshikawa and Mutharayan, 1983) and has been used in the present study for comparison purposes.

Method and Procedure

A test was administered to children of all three groups. A drawing paper (210 x 297 mm) and a soft pencil (4B) were distributed to each child. Standard instructions were given as follows:

(a) Please draw a tree bearing fruits in 10–15 minutes with the given pencil.
(b) You may use a pencil eraser.
(c) You may use the drawing paper in any direction, lengthwise or widthwise.
(d) If you cannot draw a tree bearing fruits, please draw a tree of any type.
(e) Do not refer to a living tree or a picture.

The instructions were given in Bahasa Malaysia, Mandarin or Tamil depending upon the comprehensibility of the language by the children. It was ensured that that instructions were understood by all children. In the case of the deaf children, instructions were given in 'sign language' by their teacher concerned. For the mentally retarded, instructions had to be repeated a number of times.

The drawings were classified in terms of the BAUM FORMS and SPACE CONFIGURATION that were used in the earlier study. Appendices I and II give the details of the principles of classification. It was found, however, that such a detailed classificatory scheme was not necessary for the present case where the sample was not sufficiently large to warrant very detailed comparative studies. The most significant tree forms were C i.e. the crown type and P i.e. the palm type. A small percentage of the rest were classified simply as O i.e. other.

DISTRIBUTION AND ANALYSIS OF BAUM FORMS

Normal, Deaf, Slow Learners and the Retarded

Table 1 gives the frequency distribution of the different BAUM forms obtained among the different groups of children.

Table 1
BAUM Forms in the Different Groups

Groups	C	P	O	Total
N	70 (13.7%)	342 (67.0%)	98 (19.2%)	510
S	45 (40.9%)	52 (47.3%)	13 (11.2%)	110
D	32 (48.5%)	15 (22.7%)	19 (28.8%)	66
R	2 (7.4%)	7 (25.9%)	18 (66.7%)	27
Total	149	416	148	713

Note. N = normal; S = slow learners; D = deaf; R = retarded.

The chi-squared analysis shows a significant difference in the frequency distribution of the BAUM forms among these groups of children.

$$(X^2_{cal}\ 44.394\ X^2_{(0.001)} = 13.816\ df\ 2).$$

It must be noted here that the retarded group showed some peculiarities that made them uncomparable with the other children. Yoshikawa *et al.* have classified the BAUM into various developmental categories. The progression is from infantoid to juvenile and then to the adult forms (see Appendix I). Most of the drawings obtained from the retarded children were either infantoid or not even that. Except for a few who drew a somewhat coherent picture, most of the others were *partial, incomplete, incoherent* or mere scribbles. In contrast to this, the slow learners and the deaf drew recognisable BAUMS that were mostly juvenile in the developmental characteristics. In subsequent analysis, we shall disregard the data from the retarded group and focus only on the rest.

The question now arises whether the slow learners and the deaf are different from the normal children in the distribution of C, P and O. A chi-squared analysis of the frequency distribution in Table 1 between N and S shows a significant difference:

$$(X^2_{cal}\ 44.394\ X^2_{(0.001)} = 13.816\ df\ 2).$$

A significant difference is also obtained between D and S:

$$(X^2_{cal}\ 14.031\ X^2_{(0.001)} = 13.816\ df\ 2).$$

Hence also a significant difference between N and D. in other words, the groups N, D and S are *distinct* in the distribution of the BAUM forms when classified in terms of C, P and O. The data also suggests a predominance of C among D and S compared to N.

When the BAUM forms were collapsed into the categories C and O and the distribution among the S and D were analysed, it turns out, interestingly enough, that there is *no* significant difference between the two:

$$(X^2_{cal}\ 0.962 \text{ while } X^2_{(0.05)} = 3.84\ df = 1).$$

This means that in terms of the Crown BAUM forms, the S and D are indistinguishable.

It will be interesting to find out whether such a commonality is also detectable with respect to the BAUM form P and O. When the distribution

of these forms were analysed, it was found that there is a significant difference between the two groups:

$$(X^2_{cal} 9.172 \; X^2_{0.05} = 3.84 \; df = 1).$$

The slow learners and the deaf are distinguishable as distinct groups in terms of the distribution Palm and Other but *not* in terms of Crown. and Other.

When similar comparisons were made between N and S with respect to C and O, a significant difference is obtained:

$$(X^2_{cal} = 44.256 \; X^2_{(0.001)} = 10.828 \; df = 1).$$

A significant difference also emerges between N and D with respect to C and O:

$$(X^2_{cal} = 48.45 \; X^2_{(0.001)} = 10.828 \; df = 1).$$

It is clear from the above analysis that overall, the groups N, S and D are distinct in terms of the distribution of the BAUM forms C, P and O and P and O. However, with respect to the distribution of C and O, there is *no* significant difference between S and D while there is a significant difference when these groups are compared with N. *We can conclude that the Crown Form of the BAUMS drawn reflects something common between the slow learners and the deaf.* (See Appendix III for a typical Crown Form identified.)

In terms of percentages too, it is clear that while among the N, the largest is P (67%), among the D, it is rather low (only 22.7%) and slightly higher with the S (47.3%). The above significant difference in C between N and other groups is clearly seen in the percentages. The Crown form constitutes only 13.7% for N group while 40.9% and 48.5% respectively for S and D groups. There is obviously a preponderance of C forms among the S and D distinguishing them from N.

Cultural Differences in the Distribution of BAUM Forms

Having identified the C form of BAUMS as rather distinctive of the D and S groups, it will be rather interesting to investigate whether there are any cultural differences in the distribution of BAUM forms. Unfortunately, the data from the D group was insufficient for this sort of

Table 2
Frequency Distribution of BAUM Forms Among the Different Cultural Groups

Race	C	P	O	Total
Malay	24 (51.0%)	19 (40.4%)	4 (8.5%)	47
Chinese	13 (54.1%)	9 (37.5%)	2 (8.3%)	24
Indian	8 (20.5%)	24 (61.53%)	7 (17.9%)	39
Total	45	52	13	10

The chi-squared anaysis indicates that there is a significant difference among the different cultural groups in the distribution of the BAUM forms:

$$(X^2_{cal} 10.734 \; X^2_{(0.05)} = 9.488 \text{ df } 4).$$

In order to see more clearly the nature of these differences, a pair-wise comparison was made. The percentages calculated indicates a striking similarity between the Malay and Chinese children. This identity in distribution is borne out by chi-squared analysis:

$$(X^2_{cal} = 2 \times 10^{-6} \; X^2_{(0.001)} = 5.99 \text{ df } 2).$$

The Indian students show a somewhat different pattern of distribution. A chi-squared analysis between Malay and Indian children reveals a significant difference at 0.05 level:

$$(X^2_{cal} = 8.724 \; X^2_{(0.05)} = 5.99 \text{ df } 2).$$

This also means that the distribution of BAUM forms for the Indian students also differs from the Chinese. Apparently, there is something peculiar among the slow learners in the Indian group. An examination of the table also reveals that while C BAUM form is dominant among the Chinese and Malay, it is the P form that is dominant among the Indians.

Clearly our assumption that the Crown form is peculiarly associated with D and S groups of children has to be reconsidered to accommodate the possibility of there being cultural differences. This issue became more puzzling when the BAUM forms of the slow and normal Indian children were compared (Table 3). The distribution for the normal Indian group was obtained from Yoshikawa and Mutharayan (1983).

Table 3
The BAUM Distribution Between Normal and Slow Indian Children

Race	C	P	O	Total
Indian (Slow)	8 (20.5%)	24 (61.53%)	7 (17.9%)	39
Indian (Normal)	17 (12.9%)	103 (78.0%)	32 (24.2%)	132
Total	25	127	39	171

A chi-squared analysis reveals that there is *no* significant difference between these two groups of children:

$$(X^2_{cal} = 2.824 \quad X^2_{(0.05)} = 5.991 \quad df\ 2).$$

While C form is higher among S, it is not significantly higher. It became puzzling then as to why the slow learning Indian children differed from the slow hearners from the other groups and also from the reference group.

Distribution of Multiple Images

A casual re-examination of the trees drawn showed another possible difference between the S and D groups of children. It was found that some children had in fact drawn *multiple* images of trees of various sorts where in fact the instructions did not ask for these. The verbal stimulus was simply an instruction asking them to draw a tree bearing fruits. Some children apparently interpreted this to mean multiple trees. Table 4 shows the distribution of BAUM drawn with respect to the classification, multiple versus single.

Table 4
The Distribution of Multiple vs. Single Images

Group	Single	Multiple	Other	Total
Deaf	44	16	3	63
S : Malay	45	1	2	48
S : Chinese	23	1	0	24
S : Indian	34	5	0	39
Total	146	23	5	174

A chi-squared analysis of this distribution between D and S revealed a significant difference:

$$(X^2_{cal} = 14.625 \;\; X^2_{(0.001)} = 13.816 \;\; df\, 2).$$

The D group is characterised by a *larger* presence of drawings with multiple images compared to the S group but in both groups, the dominant drawing is that of a single tree.

The data also shows no significant difference between Malay and Chinese children. Collectively, however, they differ from the D children on this score. The Indian slow learners differ significantly from the Malay and Chinese children but *do not* with the D group:

$$(X^2_{cal} = 4.732 \;\; X^2_{(0.05)} = 5.991 \;\; df\, 2).$$

It appears that there are important psychological differences closely related to the cultural factors among the slow learners. The slow learners from the Malay and Chinese cultural groups are similar to the deaf in the dominance of the Crown form in the tree drawings. But they are different in the case of multiple images. The deaf children are distinctive and there is a remarkable preponderance of the multiple images among them. The slow learners among the Indian cultural group are similar to the deaf in this respect but differ from them and the other cultural groups in not having the Crown BAUM form as the dominant one.

DISTRIBUTION AND ANALYSIS OF THE SPACE CONFIGURATION OF THE BAUMS

Another kind of analysis that has been used extensively by Yoshikawa is what has been termed, the *space configuration* of the BAUMS. The rectangular sheet is divided into four quadrants as shown in Figure 1. The displacement upwards from the centre C is termed O, downwards U, to the right R and to the left L. Apparently, there are interesting differences in the manner in which the BAUMS are displaced from the centre. This will be the focus of analysis in this section.

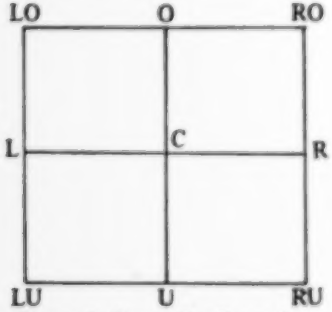

Figure 1: Space Configuration

Table 5 gives the frequency distribution of the space configurations of the BAUMS. The data for the normal group is again from Yoshikawa and Mutharayan (1983).

Table 5
Space Configuration of the BAUMS of the Different Groups

Groups	C	CL+L	CO+O	CU+U	CR	LU	LO	RU	Total
Normal	268	94	84	33	27	4	6	0	510
Deaf	0	6	5	7	4	9	6	0	44
Slow : Malay	13	14	2	2	3	9	2	0	45
Slow : Chinese	6	6	1	2	0	7	1	0	23
Slow : Indian	8	8	5	3	2	8	0	1	34
Total	302	128	97	47	36	37	15	1	656

Note. Minus drawings with multiple images.

Since important differences are to be noted in terms of L and R as well as U and O displacements, some of the above categories were collapsed as given in Tables 6 and 7.

Table 6
L and R Displacement Distribution

Groups	C	(CL+LO+ LU+L)	(CU+U)	(CO+O)	(CR+RU+ RO)	Total
Normal	268 (52.8%)	104 (20.4%)	27 (5.3%)	84 (16.5%)	27 (5.3%)	510
Deaf	8 (18.0%)	20 (45.5%)	7 (15.9%)	5 (11.4%)	4 (9.0%)	44
Slow	26 (25.6%)	55 (53.9%)	7 (6.86%)	8 (7.8%)	6 (5.9%)	102

Table 7
U and O Displacement Distribution

Groups	C	(CO+LO+ RO+O)	(CL+L)	CR	(CU+LU+ RU+U)	Total
Normal	268 (52.5%)	90 (17.6%)	94 (18.4%)	27 (5.3%)	31 (6.1%)	510
Deaf	8 (18.1%)	11 (25.0%)	6 (13.6%)	4 (9.0%)	15 (34.0%)	44
Slow	26 (25.5%)	11 (10.8%)	28 (27.5%)	5 (4.9%)	32 (31.4%)	102

A chi-squared analysis reveals a great difference among these three groups in the L and R displacements:

$$(X^2_{cal} = 75.244 \;\; X^2_{(0.001)} = 26.125 \;\; df = 8).$$

A similar significant difference is also obtained for O and U displacement:

$$(X^2_{cal} = 97.17 \;\; X^2_{(0.001)} = 26.125 \;\; df = 8).$$

Table 8 was obtained by collapsing the data further into U-type and other categories of displacement.

Table 8
U-Type and Other Displacement Distribution

Group	U-Type	Other	Total
N	31 (6.07%)	479 (93.9%)	510
D	15 (39.6%)	29 (65.9%)	44
S	32 (31.4%)	70 (68.7%)	102

A chi-squared analysis reveals a significant difference between N and D:

$$(X^2_{cal} = 68.21 \;\; X^2_{(0.001)} = 10.838 \;\; df\ 1).$$

We also obtained a similar difference between N and S:

$$(X^2_{cal} = 58.90 \;\; X^2_{(0.001)} = 10.838 \;\; df = 1).$$

The percentages reveal a similarity between D and S and a difference with N group in the U-type and other displacement. Clearly there is a preponderance of U displacement among both the deaf and slow. Something similar is also obtained for the L-type of displacement.

When the D and S groups were compared with respect to L and R displacements as given in Table 6, there appears to be no significant difference between the two:

$$(X^2_{cal} = 4.649 \quad X^2_{(0.05)} = 9.488 \quad df\ 4).$$

Absence of difference is also noted with respect to U and O displacements as given in Table 7.

$$(X^2_{cal} = 8.29 \quad X^2_{(0.05)} = 9.488 \quad df\ 4).$$

The chi-squared values indicated that perhaps the difference is not very great and a larger sample may in fact show a significant difference. The percentages (34% U, 25% O for D; 31.4% U, 10.8% O for S) indicates a preponderance of O-type among the deaf children.

CULTURAL DIFFERENCES IN SPACE CONFIGURATION

The data given in Table 5 also allows a comparison between Malay, Chinese and Indian children classified as slow learners. Tables 9 and 10 give the distribution after the data is collapsed to reveal L and R U and O shifts.

A chi-squared analysis for distribution with L and R shifts indicates no difference at 0.05 level amongst these groups:

$$(X^2_{cal} = 6.59 \quad X^2_{(0.05)} = 15.507 \quad df = 8).$$

A similar analysis for U and O shifts also reveals no difference at 0.05 level:

$$(X^2_{cal} = 4.782 \quad X^2_{(0.05)} = 15.507 \quad df = 8).$$

It appears then that L and R and U and O shifts are rather similar not only among the different cultural groups classified as slow but also between such children and the predominantly deaf children.

Table 9
L and R Shifts Among the Different Cultural Groups

Race	C	(CL+LO+ LU+L)	CU+U	CO+O	(CR+RU+ RO)	Total
Malay	13 (28.5%)	25 (55.5%)	2 (4.4%)	2 (4.4%)	3 (6.7%)	45
Indian	7 (20.1%)	16 (47.0%)	3 (8.8%)	5 (14.7%)	3 (8.8%)	34
Chinese	6 (26.0%)	14 (60.0%)	2 (8.7%)	1 (4.3%)	0 (0%)	23
Total	26	55	7	8	6	102

Table 10
U and O Shifts Among the Different Cultural Groups

Race	C	(CO+RO+ LO+O)	(CL+L)	CR	(CU+LU+ RU+U)	Total
Malay	13 (28.5%)	4 (8.9%)	14 (31.1%)	3 (6.7%)	11 (24.4%)	45
Indian	7 (20.1%)	5 (14.7%)	8 (23.5%)	2 (5.9%)	12 (35.3%)	34
Chinese	6 (26.0%)	2 (8.7%)	6 (26.0%)	0 (0%)	9 (39.1%)	23
Total	26	11	28	5	32	102

DISCUSSION OF FINDINGS

We can tabulate our findings as in Table 11.

Table 11
Main Similarities and Differences

Groups	BAUM Forms	Space Configuration
Deaf	P is dominant but not as much as for normal C form preponderant; similar to S group. Multiple images preponderant.	Different from normal in both L and R, U and O displacement. Tendency for O dominance.
Slow Learners: Malay	C preponderant; similar to D and Chinese children. Different from normal.	: Similar to D in both L and R, U and O shifts; different from normal.
Chinese:	C preponderant; similar to D and Malay. Different from normal.	: Similar to D in both L and R, U and O shifts; different from normal.
Indian:	P preponderant; different for D, Chinese and Malay. Similar to normal Indian children. Multiple image preponderant, similar to D in this respect.	: Similar to D in both L and R, U and O shifts; different from normal.

It is clear that children in the D and S groups are similar to each other and different from the normal who do not show that much of L and R, U and O shifts. In this respect, the cultural differences also do not show any variation. In BAUM forms, the deaf and the slow among the Malay and Chinese children show a definite tendency toward the C forms in contrast to the normal who largely draw the P form. The Indian slow learners resemble the normal group in this respect. A distinctive feature of the deaf is a tendency towards multiple image drawings, a tendency which is also shared by the slow learners amongst the Indian children.

Psychological Interpretations of Findings

The Tree Drawing Test itself is inspired by Jungian analytical psychology and the psychological interpretations are also founded on this system. As given in Appendix II, a shift towards the right is seen as a tendency towards extroversion while a shift towards the left, a tendency towards introversion. Unconsciousness is taken to dominate when the shift is

downwards i.e. towards U while a higher spiritual consciousness is seen to dominate when the shift is upwards towards O.

The principles of agamic psychology (Mutharayan, 1983, 1984) while being consonant with analytical psychology, is simultaneously a psychology founded on a new theory of learning. In this school of psychology, three distinct strands of learning are distinguished viz. α-learning, β-learning and γ-learning. Learning is defined as a reduction in the scope of ignorance due to effectations of some actions. The α-learning is the earliest followed by β and γ forms of learning. The α-learning is primarily *instrumental*, need-based and what is acquired is knowledge about objects other than self itself. When attention shifts to the self itself, then we have the beginnings of β-learning. Initially, it is predominantly perceptual but at higher levels, it becomes transformational. The self transforms itself into a higher kind of self through processes of deconditioning. The γ-learning is essentially archetypical-image assimilatory and spiritual. When α-learning is active, the β and γ forms of learning remain unconscious. Such a state of affair is taken to be characteristic of early childhood, the type of children we have been studying. It should be possible then to give some interpretations in terms of learning processes using the principles of agamic psychology.

A shift towards the right i.e. R can be seen as tendency towards α-learning and a shift towards the left i.e. L as an *impairment* of α-learning and probably a withdrawal into the self itself. A shift towards O can be seen as the dominance of universal intelligence processes i.e. processes under the control of a universal spiritual force D. In view of this, a shift towards U can be seen as *absence* of such learning processes possibly due to some strong blocking mechanisms.

The L and U shifts are uniformly true of the deaf and the slow learning children irrespective of cultural differences. This means that their α-learning is impaired and this may be due to the dominance of some blocking mechanisms.

Now, the Palm form is typical of normal children in the tropical countries, as noted by Yoshikawa. This can be taken to be indicative of healthy interaction with the environment. The dominance of Crown form then can be seen as indicative of pre-occupation with the self itself, the directing of the learning processes towards the psyche itself.

In the case of the deaf children, the preponderance of C form as opposed to the P could be taken as a consequence resulting from the impairment of some of their senses. Some sensory channels are cut off and thus their interaction with the environment is somewhat restricted.

Such a restriction is also seen among the slow learners in the Chinese and Malay cultural groups. But, of course, the reasons have to be rather different as there are no impairments of their senses. Perhaps we can get a clue as to the differences from the preponderance of multiple images amongst the deaf and the absence of this amongst the slow learners.

The multiple images seem to correlate with a shift towards O and hence it could be interpreted as indicative of rechanneling of the psychic forces in the direction of unconscious learning processes. It is, in other words, a sign of positive compensation for what is denied elsewhere. That this aspect is absent from the slow learners amongst the Malay and Chinese children then become peculiarly important. It would appear that these children are slow and their α-learning impaired not because of blocking mechanisms derived either from the environment or the body but from within themselves – the constitution of their psyches are such that α-learning is not promoted and internal psychic constraints are such that universal intelligent processes do not find compensatory manifestations.

In the light of this knowledge then, the peculiar position of the Indian children who are slow can be seen as follows. The fact that they are similar to the deaf in multiple images would indicate that they suffer from deprivations or intellectual stimulations, a deprivation that is compensated somewhat by an unconscious dominance of the universal intelligence processes. The fact that they produce predominantly P forms just like normal children also indicates that they may not be genuine slow learners but rather children who suffer due to lack of proper intellectual stimulations. They are α-learners but whose α-learning is not nourished sufficiently to take care of all their psychic energies.

The explanation given above from the perspectives of agamic psychology does not exhaust all the possibilities as to why a person/child draws a figure with some characteristic features. The reasons could be viewed from the psycho-dynamic angle in the following ways:

(1) A person's drawing are indicative of his cognitive and emotional development. If there has been any hazards or crisis during the developmental period, it results in arrest or retardation of development. Factors affective development could be organic and/or psycho-social. Thus, a child suffering from developmental deficit such as being mentally retarded draws a tree which is of 'infantoid' form. Similarly, deaf children and slow learners who do not suffer from developmental deficit may have sensory deficits, lack of exposure to appropriate psycho-social environment and so forth. They may draw a 'tree' which is rather immature for their physical age and which indicates emotional and other disturbances as shown in L and U displacements.

(2) Other explanations come from psycho-dynamic theory and holistic theory. As such, an organism supposed to be in continuous interaction with his environment. He is trying to construe, interprete and feel the environment, and any meaningful relationship that takes place decides how he is going to act and react towards the environment.

In this regard, any limitation of the self-progress deprivation of a sensory channel in the case of the deaf, previous unpleasant experiences in the environment are most likely to affect his perception and judgment of things. Thus, the person is likely to misconstrue or misjudge the environment. In this process, his perception is guided by his inner dynamics than the characteristics of the environment. This may explain the phenomenon as to why most normal children in the tropical countries draw 'Palm Form' while the slow and deaf draw 'Crown Form'. The Crown form can be taken to be indicative of control of behaviour by inner psychic forces.

The process in which one places unconsciously his inner attributes on to a stimulus (such as to Draw a Tree) is known as 'projection'. Not making use of the characteristics of the environment when it is freely available to the Ego is akin to ego shutting itself or 'Ego Constriction'. Thus, when one is given a task of structuring (drawing a tree) a stimulus in the absence of a guideline (he is not asked to copy a tree), a person with 'integrated ego' will make use of both information from the environment and his personal image of the tree, while a person with 'constricted ego' will make use of more of his 'personal image' of the tree. This personal image of the tree is a culmination of his thinking, feelings, needs, strivings, past experiences and even the immediate physical and mental state of the individual. While the palm-form of the tree drawn may be reflective of the former, the crown-form may be reflective of the latter. In this connection, we have to also raise questions about the occurrence of multiple images predominantly among the deaf and also among some of the slow learners. Is it indicative of some inner conflict? Or is it indicative that the person is not satisfied with the images he has formed?

From the perspectives of Ego psychology, it can be said that the occurrence of multiple images is indicative of ego defence mechanisms, specifically the mechanism of 'compensation'. Thus by drawing multiple images, the ego hides the perceived limitations or defects and over-compensates for that and thus protects its own integrity.

CONCLUDING REMARKS

This study clearly shows the potentials of the Tree Drawing Test for gaining insights into the psychological functioning of children and the manner in which cultural and other factors affect them. It has also brought out some commonalities and differences amongst the deaf and slow learning children in the primary school. The most important aspect of this study is the revelation of the possibility of there being two kinds of slow learners viz. children whose learning is impaired or somewhat not stimulated due to an absence of sufficient intellectual stimulations and children who are slow because of some internal psychic constraints. While this pilot study has not brought out the simultaneous presence of these two distinct types of slow learners amongst all the three major cultural

groups, the possibility could not be ruled out. Clearly there is a need for a large scale study of such children. For if it turns out to be true, then clearly the strategy to remediate the slow learners will be rather different and perhaps more effective.

The present study was initiated with no set hypotheses in mind. However, after the analysis of profiles of different groups of children and interpreting their psychological processes, a number of interesting hypotheses emerge. We may want to know, for example, how the features of BAUMS correlate with other established projective and non-projective tests. We may also want to know how exactly the cultural, social and organic factors interact to produce the types of psychological profiles this study has revealed. Such issues can become the basis for future studies on the Tree Test.

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